



UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL MARINE FISHERIES SERVICE  
Silver Spring, MD 20910

JUL 5 2006


Mr. Philip B. Smith  
Manager, Regulatory Affairs and  
Incidental Command  
Shell Exploration and Production Company  
45314 Obee Stevens Road  
Robert, Louisiana 70455

Dear Mr. Smith:

Enclosed is an Incidental Harassment Authorization (IHA) issued to Shell Exploration and Production Company, pursuant to Section 101(a)(5)(D) of the Marine Mammal Protection Act (16 U.S.C. 1361 et seq.), to take, by harassment, marine mammals incidental to conducting. Shell is required to comply with the conditions contained in the IHA. In addition, Shell must cooperate with any Federal, state, or local agency monitoring the impacts of your activities, and submit a draft report to the National Marine Fisheries Service's (NMFS) Office of Protected Resources, within 90 days after completion of the work authorized herein. Along with other mitigation measures to be incorporated, the IHA requires monitoring for the presence and behavior of marine mammals.

If you have any questions concerning the IHA or its requirements, please contact Ken Hollingshead, NMFS, Office of Protected Resources, at (301) 713-2289, ext. 128.

Sincerely,

  
(for) James H. Lecky  
Director  
Office of Protected Resources

Enclosure



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DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL MARINE FISHERIES SERVICE

Incidental Harassment Authorization

Shell Offshore, Inc. and WesternGeco, Inc. are hereby authorized under section 101(a)(5)(D) of the Marine Mammal Protection Act (16 U.S.C. 1371 (a)(5)(D)) and 50 CFR 216.107, to harass small numbers of marine mammals incidental to conducting marine seismic survey programs in the Chukchi and Beaufort seas in Arctic Ocean waters under the jurisdiction of the United States, contingent upon the following conditions:

1. This Authorization is valid from the date of this Authorization through December 31, 2006.

2. This Authorization is valid only for activities (including support vessels and aircraft) associated with the M/V Gilavar and M/V Henry Christoffersen conducting deep and shallow-hazard seismic survey programs in the Chukchi and Beaufort seas, as specified in Shell's November 16, 2005 application.

3 (a) The species authorized for incidental harassment takings are: bowhead whales (*Balaena mysticetus*), gray whales (*Eschrichtius robustus*), beluga whales (*Delphinapterus leucas*), killer whales (*Orcinus orca*), harbor porpoise (*Phocoena phocoena*), ringed seals (*Phoca hispida*), spotted seals (*Phoca largha*), and bearded seals (*Erignathus barbatus*).

(b) The authorization for taking by harassment is limited to the following acoustic sources:

(i) On the *M/V Gilavar*:

(A) A Bolt-seismic airgun array of 3147 in<sup>3</sup> composed of 3 identically tuned 1049-in<sup>3</sup> Bolt-gun sub-arrays operating at an air pressure of 2,000 psi;

(ii) On the *M/V Henry Christoffersen*:

(A) a dual frequency subbottom profiler, Datasonics CAP6000 Chirp II (2-7kHz or 8-23kHz)

(B) a medium penetration Subbottom profiler, Datasonics SPR-1200 Bubble Pulser (400Hz);

- (C) a hi-resolution multi-channel seismic system, 240cu in (4X60) gun array (0-150 Hz);
- (D) a multi-beam bathymetric sonar, Seabat 8101 (240 kHz); and
- (E) a side-scan sonar system, Datasonics SIS-1500 (190kHz - 210 kHz)

(c) The taking of any marine mammal in a manner prohibited under this Authorization must be reported within 24 hours of the taking to the Alaska Regional Administrator (907- 586-7221) or his designee in Anchorage (907-271-3023), NMFS and the Chief of the Permits, Conservation and Education Division, Office of Protected Resources, NMFS, at (301) 713-2289, ext 110, or his designee.

4. The holder of this Authorization is required to cooperate with the National Marine Fisheries Service and any other Federal, state or local agency monitoring the impacts of the activity on marine mammals. The holder must notify the Chief of the Permits, Conservation and Education Division, Office of Protected Resources at least 48 hours prior to the start of collecting seismic data (unless constrained by the date of issuance of this Authorization in which case notification shall be made as soon as possible), whenever moving between the Chukchi Sea and the Beaufort Sea, and whenever not conducting seismic for more than 48 hours.

#### 5. Prohibitions

(a) The taking, by incidental harassment only, is limited to the species listed under condition 3(a) above. The taking by serious injury or death of these species or the taking by behavioral harassment, injury or death of any other species of marine mammal is prohibited and may result in the modification, suspension or revocation of this Authorization.

(b) The taking of any marine mammal whenever the required seismic vessel marine mammal observer (condition 7(a)(i)) is not underway in conformance with condition 7(a)(i), or the coastal or offshore aerial, and/or the dedicated vessel and passive acoustic monitoring programs have not been fully implemented as required by this Authorization is prohibited.

(c) The taking of any marine mammals by seismic sounds when the seismic vessel is within 15 miles of another operating seismic vessel is prohibited.

(d) In accordance with the U.S. Fish and Wildlife Service stipulations (i) seismic surveys are not permitted within the Ledyard Bay spectacled eider critical habitat area; and (ii) seismic-survey support aircraft must avoid overflights of Ledyard Bay critical habitat area after July 1, unless aircraft were at an altitude in excess of 1,500 feet or human safety requires deviation (e.g. a medical emergency).

6. Mitigation.

(a) General Mitigation: The holder of this Authorization is required to:

(i) (A) Avoid concentrations or groups of whales by all vessels and aircraft under the direction of Shell. Operators of support vessels and aircraft should, at all times, conduct their activities at the maximum distance possible from such concentrations of whales. Under no circumstances, other than an emergency, should aircraft operate at an altitude lower than 1,000 feet when within 500 lateral yards of groups of whales. Helicopters may not hover or circle above such areas or within 500 lateral yards of such areas; and (B) When weather conditions do not allow a 1,000-ft flying altitude, such as during severe storms or when cloud cover is low, aircraft may be operated below the 1,000-foot altitude stipulated above. However, when aircraft are operated at altitudes below 1,000 feet because of weather conditions, the operator must avoid known whale concentration areas and should take precautions to avoid flying directly over or within 500 yards of groups of whales.

(ii) take every precaution to avoid harassment of whale concentrations when a vessel is operated near these animals. Vessels must reduce speed when within 300 yards of whales and vessels capable of steering around such groups must do so. Vessels may not be operated in such a way as to separate members of a group of whales from other members of the group.

(iii) avoid multiple changes in direction and speed when within 300 yards of whales. In addition, operators should check the waters immediately adjacent to a vessel to ensure that no whales will be injured when the vessel's propellers (or screws) are engaged.

(iv) operate small boats at a speed that would make collisions with whales unlikely.

(v) when weather conditions require, such as when visibility drops, vessels must adjust speed accordingly to avoid the likelihood of injury to whales.

(vi) operate in full compliance with the agreed-upon Conflict Avoidance Agreement.

(b) Seismic Vessel Mitigation: The holder of this Authorization is required to:

(i) Reduce the volume of the airgun array during vessel turns while running seismic lines.

(ii) To the extent practical, whenever a marine mammal is detected outside the exclusion zone radius, and based on its position and motion relative to the ship track is likely to enter the safety radius, an alternative ship speed or track will be calculated and implemented.

(iii) Exclusion and Monitoring-Safety Zones:

(A) Establish and monitor with trained observers a preliminary exclusion zone for cetaceans surrounding the Bolt-seismic airgun array where the received level would be 180 dB re 1  $\mu$ Pa rms. For purposes of the field verification test, described in condition 7(e), this radius is estimated to be 0.9 mi (1.5 km) from the seismic source.

(B) Establish and monitor with trained observers a preliminary exclusion zone for pinnipeds surrounding the Bolt seismic airgun array where the received level would be 190 dB re 1  $\mu$ Pa rms. For purposes of the field verification test this radius is estimated to be 0.3 mi (0.5 km) from the seismic source.

(C) Immediately upon completion of data analysis of the field verification measurements required under condition 7(e) below, establish and monitor new 180-dB and 190-dB marine mammal exclusion zones.

(D) Cetacean Monitor (Safety) Zones:

(1) Whenever the support “chase” vessel monitoring program described in condition 7(b) below detects an aggregation of 12 or more non-migratory balaenopterid whales within an acoustically verified 160-dB rms zone ahead of, or perpendicular to, the seismic vessel track, the holder of this Authorization must: (a) Immediately power-down the seismic airgun array and/or other acoustic sources to ensure that sound pressure levels at the shortest distance to the aggregation do not exceed 160 dB rms; and (b) Refrain from powering up the seismic airgun array until biological observers on board the support “chase” vessel(s) or survey aircraft confirm that no balaenopterid aggregations have been detected within the 160-dB zone based upon ship course, direction and distance from last sighting and the last aggregation sighting;

(2) Whenever the aerial monitoring program described in conditions 7(c) and 7(d) below detect 4 or more bowhead whale cow/calf pairs within an acoustically-verified 120-dB monitoring zone, the holder of this Authorization must: (a) Immediately power-down or shut-down the seismic airgun array and/or other acoustic sources to ensure that sound pressure levels are reduced by at least 50 percent; and (b) Refrain from ramping up the seismic airgun array until two consecutive aerial or support vessel surveys confirm that there are no more than 3 bowhead cow/calf pairs within the area to be seismically surveyed within the next 24 hours.

(3) (a) If because an aerial monitoring program cannot be implemented

due to human safety concerns, and vessel surveys are used to monitor the 120-dB monitoring zone as described in condition 7(d), a dedicated passive acoustic monitoring program, that is capable of locating the position of the vocalization, must be employed and monitored at all times that seismic is operating on the vessel.

(b) If the passive acoustic system detects one or more bowhead vocalizations within the 120-dB zone, the holder of this Authorization must: (a) Immediately shut-down the seismic airgun array and/or other acoustic sources; and (b) not proceed with ramping up the seismic airgun array until the passive acoustic monitoring program confirms that bowhead whales are not within the eastern portion of the 120-dB zone ahead of the ship's trackline over the next 24 hours.

(iv) Power-down/Shut-down.

(A) Immediately shut-down or power-down the seismic airgun array and/or other acoustic sources, whenever any cetaceans are sighted approaching close to or within the area delineated by the 180 dB (re 1  $\mu\text{Pa}_{\text{rms}}$ ) isopleth, or pinnipeds are sighted approaching close to or within the area delineated by the 190 dB re 1  $\mu\text{Pa}$  rms isopleth established under condition 6(b)(iii).

(B) Not proceed with ramping up the seismic airgun array unless the safety zones described in condition 6(b)(iii) are visible and no marine mammals are detected within the appropriate safety zones; or until 15 minutes (for small odontocetes, pinnipeds) or a minimum of 30 minutes (for mysticetes/large odontocetes) after there has been no further visual detection of the animal(s) within the safety zone and the trained marine mammal observer on duty is confident that no marine mammals remain within the appropriate safety zone.

(C) Emergency shut-down. If observations are made or credible reports are received that one or more marine mammals are within the area of the seismic survey are in an injured or mortal state, or are indicating acute distress due to seismic noise, the seismic airgun array will be immediately shut down and the Chief of the Permits, Conservation and Education Division, Office of Protected Resources or a staff member contacted. The airgun array will not be restarted until review and approval has been given by either the Alaska Regional Administrator or the Director, Office of Protected Resources or their designees.

(v) Ramp-up

(A) Prior to commencing ramp-up described in condition 6 (b)(v)(C), conduct a 30-minute period of marine mammal observations by at least one trained marine mammal observer (1) at the commencement of seismic operations and (2) at any time electrical power to the airgun array is discontinued for a period of 10 minutes or more and the marine mammal observer watch has been suspended;

(B) If the safety radii are not completely visible for at least 30 minutes prior to ramp-up in either daylight or nighttime, do not commence ramp-up unless the seismic source has maintained a sound pressure level of at least 180 dB re 1  $\mu$ Pa rms during the interruption of seismic survey operations.

(C) If the complete 180 dB safety range is visible and no marine mammals are observed while undertaking pre-ramp-up monitoring under conditions 6(b)(v)(A) and (B), ramp-up airgun arrays at a rate no faster than approximately 6 dB per 5-minute period starting with the smallest airgun in the array and then adding additional guns in sequence, until the full array is firing: (1) At the commencement of seismic operations, and (2), anytime after the airgun array has been powered down for more than 10 minutes;

(D) Do not proceed with ramp-up whenever the entire 180 dB safety zone is not visible and more than 2 power-downs due to marine mammal presence within the 180 dB safety zone had occurred within the past 12 hours.

7. Monitoring.

(a) Seismic Vessel Monitoring

(i) The holder of this Authorization must designate biologically-trained, on-site marine mammal observers (MMOs) to be onboard the *M/V Gilavar* and *M/V Henry Christoffersen*, and designated support vessels conducting marine mammal observations or surveys, approved in advance by National Marine Fisheries Service (one may be an Inupiat), to conduct the visual monitoring programs required under this Authorization and to record the effects of seismic surveys and the resulting noise on marine mammals. The minimum number of MMOs required are:

(A) Between July 15<sup>th</sup> and September 15<sup>th</sup>, there must be at least 4 trained

MMOs (one may be an Inupiat) aboard each source vessel at any one time during all seismic operations.

(B) Between September 16 and the end of the survey, there must be at least 3 MMOs onboard each source vessel at any time during all seismic operations.

(C) At least 2 observers onboard the *M/V Henry Christoffersen*.

(ii) MMOs must not be on duty for more than 4 consecutive hours, although more than one 4-hour shift per day is acceptable.

(iii) MMOs will monitor to: (A) ensure that no marine mammals enter the appropriate safety zone whenever the seismic array is on, and (B) record marine mammal activity as described in condition 7(f) below. At least two observers must be on watch during ramp ups and the 30 minutes prior to full ramp ups, and for as large a fraction of the other operating hours as possible. At all other times, at least one observer must be on active watch whenever the seismic airgun array is operating during all daytime airgun operations, during any nighttime power-ups of the airguns and at night, whenever that day's monitoring resulted in one or more power-downs due to marine mammal presence.

(iv) The crew also must be instructed to keep watch for marine mammals at all times. If any are sighted, the bridge watch-stander must immediately notify the MMO on-watch.

(v) Observations by the MMOs on marine mammal presence and activity will begin a minimum of 30 minutes prior to the estimated time that the seismic source is to be turned on and/or ramped-up.

(vi) MMOs will record the following: (A) the species, group size, age/size/sex categories (if determinable), the general behavioral activity, heading (if consistent), bearing and distance from seismic vessel, sighting cue, behavioral pace, and apparent reaction of all marine mammals seen near the seismic vessel and/or its airgun array (e.g., none, avoidance, approach, paralleling, etc) and; (B) the time, location, heading, speed, and activity of the vessel (shooting or not), along with sea state, visibility, cloud cover and sun glare at (1) any time a marine mammal is sighted, (2) at the start and end of each watch, and (3) during a watch (whenever there is a change in one or more variable); and, (C) the identification of all vessels that are visible within 5 km of the seismic vessel whenever a marine mammal is sighted, and the time observed, bearing, distance, heading, speed and activity of the other vessel(s).

(vii) All MMOs must be provided with and use appropriate night-vision devices, Big Eyes, and reticulated and/or laser range finding binoculars.

(b) Chase Boat Monitoring

(i) At least one “chase boat” will assist in monitoring safety and monitoring zones during active seismic survey operations. The chase boat will have at least two MMOs onboard to collect marine mammal observations.

(ii) During all active seismic survey activity, the chase boat will conduct marine mammal surveys no less than every 48 hours or 3 times per 7 days, of the 160-dB area to be seismically surveyed over the next 24 hours. MMOs will search for aggregations of bowhead and gray whale feeding utilizing a survey design approved in advance by the National Marine Fisheries Service.

(iii) The MMOs on the chase boat will immediately contact the seismic survey ship if marine mammals are sighted within the 180/190-dB safety zone or aggregations of 12 or more non-migratory bowhead whales or gray whales are sighted within the surveyed 160-dB zone.

(iv) The MMOs onboard chase boats will be limited to shifts of 4 hrs in length and 12 hrs total in a 24 hr period.

(c) Aerial Surveys: Beaufort Sea

(i) In accordance with the survey design described in Shell’s revised Beaufort Sea monitoring plan or subsequent revisions, the holder of this Authorization must conduct aerial surveys of the seismic area and nearby waters

(A) Twice weekly from August 25, 2006 through September 15, 2006; and  
(B) daily, weather permitting, from September 16, 2006, until 3 days after the conclusion of the seismic program.

(ii) Using standard aerial survey procedures for marine mammal surveys, monitoring is to be conducted by 2 primary biological observer(s) and a third observer for part-time observations and data logging.

(iii) Aerial monitoring will consist of noting the marine mammal species, number, age/size/sex class (if determinable), general activity, heading (if consistent), swimming speed category (if traveling), sighting cue, ice conditions, and inclinometer reading.

(iv) After September 1, the aerial survey will look for migratory cow/calf pairs during normal survey activity. If the biological observers onboard the aircraft see 4 or more migratory bowhead whale cow/calf pairs within the surveyed portion of the 120-dB isopleth from the seismic survey vessel, the lead observer or his/her designee will contact the MMO on watch onboard the seismic vessel of the observation. The location, bearing and approximate speed of the migratory bowhead whales will be recorded.

(d) Aerial Surveys, Chukchi Sea

(i) In addition to the coastal aerial monitoring program mentioned in condition 8(a)(ii), the holder of this Authorization must implement an aerial monitoring program in the Chukchi Sea upon the earliest of the following conditions: (i) the research vessel monitoring program mentioned in condition 8(a)(iii) has detected 4 migratory cow/calf pairs at the surface during a vessel transit (ii) bowhead whale hunters have determined that the “pulse” of cow/calf pairs are passing Barrow AK in significant numbers (and NMFS has been so notified by the Alaska Eskimo Whaling Commission) or (iii) September 25, 2006.

(ii) Once initiated, aerial monitoring will take place daily (weather permitting), concentrating on the area (A) ahead of the vessel track, (B) upstream of bowhead whale migration, and (C) east of the vessel, whenever Shell’s seismic vessel is conducting seismic surveys and is operating within an area of the Chukchi Sea that can be aerially surveyed safely.

(iii) If the biological observers onboard the aircraft see 4 or more migratory bowhead whale cow/calf pairs within the surveyed portion of the 120-dB isopleth from the seismic survey vessel, the lead observer of his/her designee will contact the MMO on watch onboard the seismic vessel of the observation. The location, bearing and approximate speed of the migratory bowhead whales will be recorded.

(iv) Following the suspension of seismic surveys after sighting 4 or more migratory cow/calf pairs, aircraft surveys should initiate new surveys in the area surveyed the previous day.

(e) Field Source Verification Using a bottom founded hydrophone system, the Holder of this Authorization is required to measure and report on the distances from the airgun array to broadband received levels of 190, 180, 170, 160, and 120 dB (rms) re 1 Pa. at the beginning of the survey in the Chukchi Sea and Beaufort Sea in water depths shallower than 200 m (656 ft) and water depths greater than 200 m (656 ft).

8. Research

(a) The holder of the Authorization, in cooperation with other Authorization holders conducting seismic surveys in the Chukchi Sea during 2006, must conduct all research described in the “Final Monitoring Plan for Seismic Exploration in the Alaskan Chukchi Sea, 2006.” Monitoring will include establishment of: (i) an acoustic program to measure sounds produced by seismic vessels (required under condition 7(e)), (ii) an aerial monitoring and reconnaissance of marine mammals available for subsistence harvest along the Chukchi Sea coast; (iii) research ship surveys of the Chukchi Sea, including a towed hydrophone passive acoustic monitoring system to collect data on the distribution and abundance of marine mammals; and (iv) deployment, and later analysis of data from, bottom-founded autonomous acoustic recorder

arrays along the coast of the Chukchi Sea to record ambient sound levels, vocalizations of marine mammals, and received levels of seismic operations should they be detectable.

## 9. Reporting.

(a) Field Source Verification and the distances to the various radii are to be reported within 72 hours of completing the measurements. In addition to reporting the radii of specific regulatory concern, distances to other sound isopleths down to 120 dBrms (if measurable) will be reported in increments of 10 dB.

(b) Seismic Vessel Monitoring Program: A draft report will be submitted to the National Marine Fisheries Service within 90 days after the end of Shell's seismic survey program in the Arctic Ocean. The report will describe in detail (i) the operations that were conducted, (ii) the results of the acoustical measurements to verify the safety radii, (iii) the methods, results, and interpretation pertaining to all monitoring tasks; (iv) the results of the 2006 shipboard marine mammal monitoring; (v), a summary of the dates and locations of seismic operations, including summaries of power downs, shut downs, and ramp up delays; (vi) marine mammal sightings (species, numbers, dates, times and locations; age/size/gender, environmental correlates, activities, associated seismic survey activities), (vii) estimates of the amount and nature of potential take (exposure) of marine mammals (by species) by harassment or in other ways to industry sounds; (viii) an analysis of the effects of seismic operations (e.g., on sighting rates, sighting distances, behaviors, movement patterns of marine mammals); (ix) provide an analysis of factors influencing detectability of marine mammals; and (x) provide summaries on communications with hunters and potential effects on subsistence uses.

(c) The draft report will be subject to review and comment by the National Marine Fisheries Service. Any recommendations made by the National Marine Fisheries Service must be addressed in the final report prior to acceptance by the National Marine Fisheries Service. The draft report will be considered the final report for this activity under this Authorization if the National Marine Fisheries Service has not provided comments and recommendations within 90 days of receipt of the draft report.

(d) A draft comprehensive report describing the acoustic, vessel-based, and aerial monitoring programs will be prepared and submitted within 240 days of the effective date of this Authorization. The comprehensive report will describe the methods, results, conclusions and limitations of each of the individual data sets in detail. The report will also integrate (to the extent possible) the studies into a broad based assessment of all industry activities and their impacts on marine mammals in the Arctic Ocean during 2006.

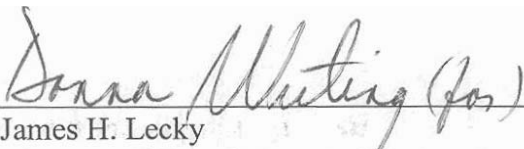
(e) The draft comprehensive report will be reviewed by participants at the 2007 Open Water Scientific Meeting to be held in Anchorage AK in April, 2007. The draft comprehensive report will be accepted by the National Marine Fisheries Service as the final comprehensive

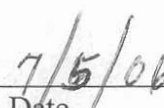
report upon incorporation of recommendations by the workshop participants.

10. Activities related to the monitoring described in this Authorization do not require a separate scientific research permit issued under section 104 of the Marine Mammal Protection Act.

11. The Plan of Cooperation/Conflict Avoidance Agreement outlining the steps that will be taken to cooperate and communicate with the native communities to ensure the availability of marine mammals for subsistence uses, must be implemented.

12. A copy of this Authorization must be in the possession of the operator of all vessels and aircraft engaging in the activity operating under the authority of this Incidental Harassment Authorization.

  
James H. Lecky  
Director, Office of Protected Resources  
National Marine Fisheries Service

  
Date